

Appendix B - Project Design and Resource Protection Measures Applicable to Alternative 2

In response to public comments on the proposal, existing standards and guidelines, and resource specialist concerns, project specific design and resource protection measures were developed to prevent potential impacts to resources as a result of implementing the proposed action or an alternative action. These are measures that are considered routine, have been used on similar projects, and are either incorporated into contract provisions or accomplished between appropriate resource specialists, and have proven to be effective. The particular design of the action alternatives and these resource protection measures are used as a basis for determining and disclosing effects in the Environmental Consequences (Chapter 3) discussions.

Special Uses

1. Electronic sites on Spodue and a buried cable that runs along Road 3462 and through the forest up to the top of Spodue Mountain must be protected during all activities.

Cultural and Heritage Resources

1. There would be pre-operations coordination between the assigned Archaeologist and either the sale administrator, contracting officer's representative, or force account work leader to discuss all information pertaining to cultural resource protection. A clear protective strategy for each of the known sites in the project area will be communicated. Examples of protective strategies include flag and avoid, hand felling, and requirements for locations of temporary roads, landings or log decks, and/or monitoring. Specifics are described in the Archeology Survey Report (2008) for the project.
2. Establishment of protection lines or other avoidance measures, such as lighting patterns would be implemented prior to any prescribed burning near cultural sites.
3. In the event of new cultural materials being discovered during on-the-ground preparation for the project or at any time during any ground disturbing activity, work in the immediate vicinity would cease until the Eastside Archeologist has reviewed the site on the ground and protection measures have been developed.

Soils/Hydrology

1. Best Management Practices – All roadwork associated with implementation of the project would follow the Roads Best Management Practices (Fremont National Forest Supplement). All timber sale-associated work (all thinning treatments) would follow the Timber Sale Best Management Practices (Fremont National Forest Supplement). See Appendix B. BMPs provide project specific incorporation of the guidelines in the Fremont National Forest Soil Productivity Guide (USDA 2000, as amended 2002).
2. In the event that a temporary road crosses an intermittent stream channel, all work at the crossing, including construction and decommissioning, would occur when the stream channel is dry or within the ODFW preferred instream work window (August 1 to September 30).

3. Thinning treatments of moist lodgepole stands, and encroaching conifers from aspen stands and meadows would be accomplished under appropriate conditions (i.e. dry soils, frozen ground, or adequate snowpack) that prevent adverse impacts to soils (see BMPs).

Sycan Wild and Scenic River

1. No temporary road construction in Wild and Scenic River Corridor.
2. No fire ignition would occur within 100 feet of the river.
3. No burn piles would be located within 100 feet of the river.
4. No water withdrawal from the Sycan River or its tributaries for dust abatement on roads.

Fisheries

Small Tree (Pre-commercial) Thinning

1. No trees would be cut on any streambank.
2. When practicable, trees would be felled toward stream channels.
3. Unless a fuels issue, trees would generally be left whole (not lopped and scattered or crushed) within RHCAs.

Commercial Thinning within RHCAs

4. All commercial treatment within RHCAs would be coordinated with and approved by the Southeast Zone Fisheries Biologist prior to implementation.
5. No cutting of commercial sized trees within 10 feet of any stream channel. No ground-based equipment is to operate within 30 feet of any stream channel.
6. Temporary roads will not cross perennial streams.

Prescribed Fire Operations

7. Fire ignition during prescribed fire operations would cease 50 feet from stream channels.
8. Firelines would not be constructed within RHCAs.
9. To the greatest extent possible/feasible all fireline would be restored to pre-disturbance contours. All fireline rehabilitation would occur in the same calendar year that the burning is implemented. All fireline would be rehabilitated to the following standards:

Hand-Constructed Fireline: Hand construct waterbars according to the spacing guidelines shown in the table below. Where feasible, angle waterbars to direct water outlet into the unburned side of the fireline, and pull back berms.

Table 2-2. Minimum Waterbar Spacing for Handline Rehabilitation

Fireline Gradient (%)	Minimum waterbar spacing (ft.)
0-20	100
21-40	50
41+	25

Tractor Plow-Constructed Fireline: Construct waterbars according to the spacing guidelines shown in the table below. Where feasible, angle waterbars to direct water outlet into the unburned side of the fireline, and pull back berms.

Table 2-3. Minimum Waterbar Spacing for Tractor Plow Fireline Rehabilitation

Gradient (%)	Cross drain spacing (feet)
0-5	200-160
6-10	160-120
11-15	120-100
16-20	100-60
21-30	60-40
31-45	40-25
46 +	25

Invasive Species

2. Notify Eastside Botanist at least 30 days prior to any off-road equipment operating within the project area to ensure all noxious weed sites are properly flagged for avoidance.
3. Weed sites would be avoided when possible. Forest Service personnel implementing activities would be provided a map of known weed locations within the area so disturbance can be minimized. Avoidance of weed sites would minimize the potential of spreading seeds through the implementation of project activities.
4. Areas infested with weeds would not be used as log deck landings, fire crew bases, helibases, camps, or staging areas.
5. If noxious weed sites are discovered within the project area, report the sighting to District Weed Personnel. The site would be reviewed on the ground and additional invasive plant prevention practices would be developed as appropriate.
6. Actions conducted or authorized by written permit by the Forest Service that will operate outside the limits of the road prism (including public works and service contracts), require the cleaning of all heavy equipment (bulldozers, skidders, graders, backhoes, dumptrucks, etc.) prior to entering National Forest System Lands. This does not apply to initial attack of wildland fires, and other emergency situations where cleaning would delay response time (USDA Forest Service, 2005).

7. Inspect active gravel, fill, sand stockpiles, quarry sites, and borrow material for invasive plants before use and transport. Treat or require treatment of infested sources before any use of pit material. Use only gravel, fill, sand, and rock that are judged to be weed free by District or Forest weed specialists (USDA Forest Service, 2005).
8. Conduct road blading, brushing and ditch cleaning in areas with high concentrations of invasive plants in consultation with District or Forest-level invasive plant specialists, incorporate invasive plant prevention practices as appropriate (USDA Forest Service, 2005).
9. Native plant materials are the first choice in revegetation for restoration and rehabilitation where timely natural regeneration of the native plant community is not likely to occur. Non-native, non-invasive plant species may be used in any of the following situations: 1) when needed in emergency conditions to protect basic resource values (e.g., soil stability, water quality, and to help prevent the establishment of invasive species); 2) as an interim, non-persistent measure designed to aid in the re-establishment of native plants; 3) if native plant materials are not available; or 4) in permanently altered plant communities. Under no circumstances will non-native invasive plant species be used for revegetation (USDA Forest Service, 2005).

Wildlife

1. Should any proposed or listed endangered, threatened, or sensitive species be found during project activities within, adjacent, or near enough that activities could be a disturbance, activities would be halted until the effects of the activity can be determined and protection measures adopted.
2. If an active raptor nest is found during operations, Forest Plan Standards and Guidelines would be followed at a minimum. The Forest Plan states that “*major activities such as logging and road construction adjacent (within 300 yards) to active raptor nests, should be postponed until young have fledged (usually around July 30)*” (Forest Plan p.180).
3. Prairie Falcon nest protection – Limited operating period (LOP) within ½ mile of the nest site. No activities to occur during the LOP of April 1 through July 30. This restriction may be waived in a particular year if surveys reveal that the species indicated is non-nesting or that no young are present that year.

Air Quality

1. Plastic sheeting material would not be used on any piles planned for burning.
2. Conduct prescribed fire in compliance with National Ambient Air Quality Standards, Oregon Department of Environmental Quality regulation and restrictions, and under the Oregon Smoke Management Plan regulations and restrictions.

Roads

1. Forest specifications for snow removal would govern winter haul operations on all FS system roads.

Range

1. Implementation of project activities would be coordinated with the grazing permittees, through the Range Specialist, so that permitted use of the grazing allotments is not adversely affected.

Black Hills Project BMPs

Best Management Practices (Fremont National Forest Supplement)

Best management practices (BMPs) are the primary mechanisms to enable the achievement of water quality standards (Environmental Protection Agency, 1987). The following BMPs have been selected and tailored for site-specific conditions. The BMPs are a supplement to the General Water Quality Best Management Practices, Pacific Northwest Region, 1988. The practices apply to activities covered in and implemented through the Black Hills Project and its' Environmental Analysis whether it be through stewardship contracts, timber sale contracts, public works contracts, or force account activities.

The interdisciplinary team (soil/water/fish) specialists are responsible for including the BMPs in the Environmental Assessment (EA) for purposes of implementation on the ground. The interdisciplinary team should review the marking guide and contract documents to ensure inclusion of the BMPs.

Measures shown in the following BMPs shall be incorporated into marking guides, timber sale contracts, public works contracts and firewood permits as appropriate. Completion of environmental analyses and project implementation is the responsibility of the District Ranger. The Timber Management Supervisor should ensure inclusion of the BMPs in the marking guide and the timber sale contract. The Sale Administrator is responsible for following through with implementation of the BMPs and EA as incorporated into the timber sale contract. It is the responsibility of the District Fire Management Officer to ensure inclusion of BMPs into the design and implementation plans for fuel reduction.

In both timber sale contracts and public works contracts, mitigations found in the following BMPs should be included in the contract provisions and special project specifications. It is the responsibility of the transportation engineer to ensure inclusion of BMPs in the public works package. The Contracting Officer's Representative (COR) is responsible for following through with implementation on the ground.

Timber Harvest BMPs

T-1. Title: Timber Sale Planning Process. Water quality, fisheries and hydrologic considerations will be included in the timber sale planning process during development of the EA or Environmental Impact Statement (EIS). Mitigation measures shall be provided by soil/water/fisheries specialists, which may include these BMPs, amended as necessary for the specific project.

T-2 Title: Timber Harvest Unit Design. Timber units will be identified during the EA process and will be designed to meet the Purpose and Need identified. They should be designed in such a manner that they result in favorable conditions (or move toward favorable conditions) of water flow, water quality, soil productivity and fish habitat. Riparian Habitat Conservation Areas (RHCAs), as defined by the Inland Native Fisheries Strategy (INFISH), are generally excluded from timber harvest, unless it is determined through the Environmental Assessment (EA) process that silvicultural practices are needed to enhance riparian vegetation characteristics or to promote large wood (INFISH, TM-1, pg E-7). In these cases, RHCAs may be entered; however, the following BMPs should be closely followed to protect the riparian resources.

T-4 Title: Use of Sale Area Maps for Designating Water Quality Protection Needs. In addition to what is already required on the Sale Area Maps, the following features must be located on the Sale Area map or a supplemental vicinity map. These areas should be flagged on the ground as determined necessary by the presale forester. This will provide information in addition to the required information that is required to be in the Sale Area Map. The purpose is to identify sensitive watershed features and provide for protection of these areas.

Category 1 through 4 Streamside Management Designation areas and associated RHCA widths (see BMP T7).

Location of features to be protected, including scabrock flats and meadows and other features identified by the ID team.

Unstable areas where no harvesting or mechanized equipment is to operate.

This map is prepared from input provided by the ID team and logging system specialists. As part of sale layout, the presale forester will mark the timber with the assistance of the hydrologist/fisheries biologist as requested. The Sale Administrator and Purchaser should review the mapped features and flagged areas on the ground prior to harvesting.

T-5 Title: Limiting the Operating Period of Timber Sale Activities

Equipment operations will be limited in timing in certain areas of the project to protect soil and aquatic resources and to reduce the chance of wildfire ignition from equipment operation.

a) Equipment may operate over-the-snow in almost all areas provided the ground surface is not contacted by tires or treads of equipment. Permanent streams may only be crossed at designated sites, but ephemeral channels, scabrock flats and meadows may be crossed as needed.

b) Equipment may not operate when soil conditions are such that detrimental puddling occurs and ruts from vehicle tracks reach four inches or more in 500 feet.

c) Soil moisture must be less than 15 percent to operate equipment off of the main skid trails.

T-7 Title: Streamside Management Unit Designation. For these BMPs the Streamside Management Units (SMUs) identified in the Forest Plan are replaced with RHCAs as defined in INFISH. The category of stream and RHCA width will be shown on the Sale Area map or supplemental vicinity map.

Category 1, Fish-bearing streams. Interim RHCAs consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet, including both sides of the stream channel), whichever is greatest.

Category 2, Permanently flowing non-fish-bearing streams. Interim RHCAs consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance (300 feet, including both sides of the stream channel), whichever is greatest.

Category 3, Ponds, lakes, reservoirs, and wetlands (and scabrock flats) greater than 1 acre. Interim RHCAs consist of the body of water or wetland and the area to the outer edges of the riparian vegetation, or to the extent of the seasonally saturated soil, or to the extent of moderately and highly unstable areas, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetlands pond or lake, whichever is greatest.

Category 4, Seasonally flowing or intermittent streams, wetlands less than 1 acre, landslides, and landslide-prone areas. This category includes features with high variability in size and site-specific characteristics. At a minimum the interim RHCAs must include:

- a. The extent of landslides and landslide-prone areas
- b. The intermittent stream channel and the area to the top of the inner gorge
- c. The intermittent stream channel or wetland and the area to the outer edges of the riparian vegetation
- d. For Priority Watersheds (bull trout watersheds) the area from the edges of the stream channel, wetland, landslide, or landslide-prone area to a distance equal to the height of one site-potential tree, or 100 feet slope distance, whichever is greatest.

- e. For watersheds not identified as Priority Watersheds, the area from the edges of the stream channel, wetland, landslide, or landslide-prone area to a distance equal to one-half the height of a site potential tree, or 50 feet slope distance, whichever is greatest.

Other Streamside Management Units. Ephemeral stream channels/draws shall have protection as required in the Fremont National Forest Land and Resource Management Plan, page 204. This requires that the bottoms of ephemeral channels/draws will not be used for skid trails, landing sites, or as road locations. There is no RHCA width associated with ephemeral stream channels. Equipment disturbance of duff and soil should be minimized.

T-8 Title: Streamcourse Protection Implementation and Enforcement. The objective of this BMP is to:

- 1) Protect the natural flow of streams,
- 2) Provide unobstructed passage of storm water, and
- 3) Prevent sediment and other pollutants from entering streams.

The following practices apply:

- a. Purchaser shall repair damage to banks and channels, to the extent practicable.
- b. Project debris shall not be left within the high water mark along stream channels, unless it would add to the objective of large wood recruitment. Wood that is 12-inch diameter (small end) and 8 or more feet in length should be left and smaller logging slash should be removed. The proportionality of the large wood may be adjusted by the ID team, considering such things as the size of the stream, amount of large wood that is naturally available in the dominant forest type adjacent to the riparian area.

RHCAs are areas that receive special protection. Equipment should operate within guidelines provided below.

Crossing RHCAs. Equipment is permitted to enter RHCAs only at locations agreed to by the Sale Administrator or Contracting Officer's Representative and the Purchaser or Contractor. Temporary roads and skid trails in RHCAs should be kept to as few as possible. These should be designated following the guidance in BMP T11.

Skidding across Category 1 and 2 streams is not permitted unless a temporary culvert or bridge is used that would keep all skidding activities out of the stream channel. Skidding across Category 1 and 2 should only be done at designated right angle crossings. Logs placed in the channel, parallel to flow, are acceptable, providing there is adequate space left for fish passage. Structures are temporary and shall be removed when not needed any more, at the end of the season or prior to seasonal rains, whichever occurs first. Damaged stream banks and crossings shall be reshaped to stable conditions and have a seed mix applied as designated in BMP T14.

Skidding across Category 4 streams and ephemeral channels/draws should only be done at designated right angle crossings. Damaged stream banks and crossings shall be reshaped to stable conditions and have a seed mix applied as designated in BMP T14.

No skidding is permitted across Category 3 ponds, lakes, reservoir, and wetlands or across wetlands springs or wetlands. Scabrock flats and meadows identified by the ID team (see BMP T4) should not be skidded across. If there is a question during skid trail layout, seek the advice of the hydrologist.

Timber Harvest Within RHCAs. In general, skid trails will not be allowed in RHCAs for purposes of logging the RHCA, unless it is determined necessary for riparian benefit (see BMP T2). Where it is determined that logging will occur within RHCAs, site specific resource protection measures identified in the alternative descriptions of Chapter 2 of the EA will be implemented. Winter logging, as defined in BMP T13, may allow skid trails and dispersed operations within the entire width of the RHCAs, by written agreement, if winter logging requirements are met. This exception does not apply to wetlands and scab rock flats.

Generally, it is unacceptable to utilize existing landings, skid trails, temporary roads, etc. within RHCAs, except for right angle crossings, as provided in 1 through 3 above. In some exceptions, the Sale Administrator may utilize these areas when the operator would rehabilitate these areas, and there would be a net ecological gain from doing so. This will be left up to the discretion of the Sale Administrator, who should seek advice from the hydrologist or fisheries biologist.

Water bars and other erosion control structures will be located in a manner that will prevent water and sediment from being channeled into streams, and to dissipate concentrated flows.

T-9. Title: Determining Tractor Loggable Ground. Areas requiring special skidding requirements (i.e. bull lining) shall be shown on the Sale Area Map, as identified by the ID team. The maximum slopes suitable for ground-based skidding equipment are identified in the Fremont National Forest - Soil Resource Inventory (SRI). Where short steep pitches exceed those in the SRI, special mitigations such as endlining logs from the steep slopes to ground-based skidding equipment working on more gentle slopes is allowed. Unless approved by the sale officer, hand felling will be required, as well as hand water barring, in the steep slope areas.

The equipment restrictions discussed above also apply to post harvest slash treatment and site prep operations where ground-based equipment is used, these considerations should be identified in the EA.

T-10. Title: Log Landing Location (Fremont - N.F. Supplement). The sale administrator and purchaser prior to construction or opening of existing landings must agree to the location and clearing limits for all landings. The following criteria will be used for landing location and design.

- 1) The cleared or excavated site shall be no larger than needed for safe and efficient operations.
- 2) Where a choice exists, sites are selected for the least amount of excavation and erosion potential.
- 3) No landings will be allowed in critical watershed or soil areas, RHCAs, or protected streams. Existing landings will not be used within RHCAs, except as provided under BMP T8.
- 4) Landings are located where the least number of skid roads are needed.
- 5) Where practical, landings are positioned for level skid road approach.
- 6) Landings will be shaped to drain in a planned direction and manner to minimize erosion and sediment delivery to streams, roads, and road ditch lines.

T-11. Title: Tractor Skid Trail Location and Design. All skid trails shall be flagged on the ground by the purchaser or agreed to by description between the sale administrator and the purchaser prior to use or construction.

On lands with prior entry, spacing between skid trails should be between 100 and 150 feet and the width of each skid trail should not be more than 14 feet. Existing skid trail systems should be used to the extent practicable to achieve the spacing of 100 to 150 feet. Those skid trails between the 100 to 150 feet spaced skid trails should generally not be used, unless otherwise identified in the EA.

On those lands with no prior entry, spacing of skid trails should average approximately 100 to 150 feet apart and the width of each skid trail should not be more than 14 feet. The following apply to logging methods and equipment:

Conventional Logging Methods.

- 1) All harvest units will utilize designated skidtrails.
- 2) Spacing of skidtrails should average 100-150 feet apart and not be greater than 14 feet wide.

Mechanized Logging Equipment.

- 1) Conventional skidding equipment should be confined to designated skidtrails.
- 2) Go-to machines, i.e., those feller-bunchers that drive up to each individual tree, will generally not be permitted unless the soil is frozen.

3) Mechanized cut-to-length systems and forwarders with ground pressure (approximately less than 7.5 psi) that drive over a continuous 4-6 inch layer of slash are acceptable for dispersed operations.

4) Feller-buncher equipment with psi ratings of approximately 7.5 psi or less can operate off of main skid trails during the dry period of the year (July 15 through October 31). Outside of this period, soil moisture must be less than 15 percent to operate off of the main skid trails (except for winter exception BMP T13). Cutting lanes should be used that are spaced approximately 40 feet apart.

T-13. Title: Erosion Prevention and Control Measures During Timber Sale Operations.

Restrict winter logging to conditions, which protect the soil. Soil should be frozen to a minimum of 4 inches and/or have a snow cover of a minimum of 18 inches. Snow must be firm, i.e., cold conditions, and not soft from an extended or daily warming period. Tires and/or tracks breaking through the snowpack to an unfrozen soil surface are unacceptable operating conditions.

Erosion control work, road maintenance, and other contractual agreements must be completed in a timely manner as specified in the timber sale contract.

Logs will normally be fully or one-end partially suspended in harvesting operations.

The operating period will be limited to restrict the Purchaser's activities to specified periods of the year or as agreed to in writing, when necessary to protect a resource (see BMP T11 for period of operation for feller-bunchers).

T-14. Revegetation of Areas Disturbed by Harvest. Seed should be applied on areas of bare mineral soil that are over 1,000 square feet in area. This typically includes temporary roads, landings, stream crossings, etc.

Seed shall meet the requirement that the seed does not contain noxious weed seed in excess of established state limitations as listed in the current "State Noxious Weed Requirements Recognized in the Administration of the Federal Seed Act" publication (commonly referred to as the "all states" noxious weed seed list). The seed shall be a sterile wheat grass applied at a rate of 25 pounds per acre, unless otherwise identified in the EA, or native seed when available and specified by the ID team. If this seed cannot be attained, the Sale Administrator may allow another seed mix, subject to review with the hydrologist or fisheries biologist.

Note: - The IDT, through the NEPA analysis, determined seeding on skidtrails and landings would not be necessary to prevent erosion based on the low relief topography of the subwatersheds and the moderate erosion risk of the soil types present in stands identified for commercial harvest. Skidtrails and landing should be scarified to promote natural revegetation.

T-15. Title: Log Landing Erosion Prevention and Control. Contract provisions will require that landings associated with the timber sale will be ditched and/or sloped to permit drainage and dispersion of water. After landings have served the Purchaser's purpose, the Purchaser shall

ditch or slope the landings to permit the drainage and dispersion of water. All skid trails and temporary road waterbars in the vicinity of the landing will be drained so that all water is turned and will not enter the landing.

T-16. Title: Erosion Control on Skid Trails (& Cable Corridors). *Skid Trails.* The Purchaser and Sale Administrator shall agree to the location of all erosion control measures on the ground. Waterbars constructed on skid trails must be located, and properly constructed, to provide adequate cross drainage that reduces erosion, dissipates sediment and helps to keep water/sediment within upland areas.

The water bar should be cut into the native soil to a minimum depth of 6 inches and should have an 18-inch rise between the low point and high point. Alternatively, when skid trails are not entrenched, slash barriers can be used. Slash barriers should be constructed of slash that is a minimum of 3 inches in diameter and larger material, and should run perpendicular or slightly skewed to the trail. The barrier should extend outside of the trail area to direct sediment and water onto the uplands.

Waterbars and slash barriers should have outlets that are open and will allow free flow of water and sediment onto the uplands.

Provide the appropriate number and spacing of cross drains on skid trails and skid roads. The following table is a guide for cross drain spacing:

Cross Drain Spacing		
	<i>Non-pumice soil</i>	<i>Pumice soil</i>
Gradient (%)	Cross drain (feet)	Cross drain (feet)
0–5	200–160	200–300
6–10	160–120	200–160
11–15	120–100	160–120
16–20	100–60	120–100
21–30	60–40	100–60
31–45	40–25	60–40
46 +	25	25

Cable Corridors. A minimum of one slash barrier should be placed every 100 feet along the length of cable logging corridors. Slash barriers should be constructed as discussed above. The sale administrator will designate hand placed water bars on areas of the corridors that show potential to channel water due to cable logging activities, using the above distance guide.

T-17. Title: Meadow Protection During Timber Harvesting. Tractor harvest is excluded year round from wetlands, bogs, wet meadows and scabrock flats. The wet meadow areas shall be identified on the timber sale vicinity map where necessary to provide protection.

Roads BMPS

R-1. Title: General Guidelines for the Location and Design of Roads. There are several general considerations, which must be incorporated into the planning of road locations and designs. These measures are preventive and indirectly protect water quality and associated aquatic resources. The following apply to all transportation activities:

- a. A basic requirement for transportation facility maintenance and operation is the formulation and evaluation of alternatives, and the selection of an alternative that best meets safety objectives with the least adverse affect on environmental values.
- b. In the location and design, of treatments adjacent to roads, an interdisciplinary team will be used to evaluate the effects of operations to minimize adverse economic, environmental, and social impacts.
- d. Road design standards and design criteria are based on a transportation plan for the area, an economic analysis, road management objectives which identify traffic requirements during and following the timber sale, safety requirements, resource objectives to be met or mitigated, and special resource concerns.
- e. Every attempt should be made to maintain the function of floodplains to accommodate a 100-year flood event in accordance with standards set forth in the Inland Fish Strategy or other appropriate Regional Direction.
- f. Road construction and maintenance activities shall follow the Forest Service Specifications for Construction of Roads and Bridges (EM-7720-100, 1995, as amended).

R-2. Title: Erosion Control Plan. The Purchaser/Contractor must provide a written schedule for erosion control work. This will include all erosion control items identified in the contract. All phases of the project will be considered. The schedule for erosion control work must be approved by the Contracting Officer prior to implementation.

R-3. Title: Timing of Construction Activities. Minimize erosion by allowing road construction related activities to operate only during low runoff periods. Soil erosion and sedimentation are directly related to runoff. Furthermore, equipment should not be allowed to operate when ground conditions are such that detrimental puddling occurs and ruts from vehicle tracks reach four inches or more in 500 feet. Over-the-snow operation is an acceptable and preferable means of reducing erosion and sedimentation so long as there is a complete coverage of snow or the ground remains firmly frozen.

Timing of construction activities are subject to approval by the Engineering Representative (ER)/Contracting Officer's Representative (COR). The following are guidelines for timing of construction activities:

Erosion control will be kept current throughout the contract period. Specific items will be identified in the contract package (e.g. placement of mulched material or straw wattles).

Construction of road drainage and other erosion control measures will be carried out as soon as possible after earthwork is completed. If drainage and erosion control cannot be completed prior to the fall-wet season, then, construction should be delayed until the following year. When construction activities are carried out, erosion control measures will be completed prior to fall shutdown or outside the normal operating season.

Timing of instream construction is addressed in BMP R-13.

These guidelines should be incorporated into the contract and subsequently into the Erosion Control Plan that is prepared by the Purchaser/Contractor.

R-7. Title: Control of Surface Road Drainage Associated with Roads. Ditching, outsloping, insloping, and rolling the grade are used on roads to control surface erosion. On high clearance roads, diversion of water off-road surfaces should be accomplished by rolling the grade of the road. Rolling of the grade is identified as part of the road location and carried through in pioneering and construction of the road (versus installing dips after the finished grade is complete). Standards for dip design on roads are found in the Transportation Engineering Handbook (FSH 7709.56). The recommended spacing of rolling dips is $400' / \% \text{Slope} + 150'$ (for example: a grade of 4% would have a spacing equal to $400' / 4 + 150' = 250'$). Rolling dips should be designed with an adverse grade on the downhill side and, where economically possible, should be armored with aggregate to prevent traffic from cutting through the structure.

Ditched roads should have culverts and/or dips installed periodically to carry this water across the road. Maximum spacing of culvert and/or road drainage structures should be determined by soil erosion classes and road grade as described in the Road Design Handbook (Lecklider and Lund, 1971). Water should not be released onto fill slopes. Culverts and dips should have outlets, which are protected by rock or other types of splash basins to reduce the energy of emerging water.

Because surface erosion on fill and cut slopes is also highest the first year after disturbance (Burroughs and King, 1989), it is necessary to have slope stabilization work completed while soil on cut and fill slopes are still in a roughened condition and prior to the first winter season after construction activities started. Long-term establishment of native grass and herb species should be pursued whenever possible.

Outsloping of the roadway is preferred, except in cases where outsloping would increase sediment delivery to streams or where outsloping is infeasible or unsafe.

Cross drains should be placed upslope from the stream crossings for a distance of at least 100 feet on roads with drainage dips and 300 feet on roads with culverts.

Where streams (perennial, intermittent and ephemeral channels/draws) are crossed, fords or culverts should be used. An adverse grade should be provided in both directions from the stream crossing so that high water does not flow down the road surface prism during high flow events.

Construction activities within RHCA's should use straw bales and/or filter fabric where appropriate to control sediment input to the stream system. The typical locations for this material is below construction activities where an adequate natural buffer does not exist that would help to prevent sediment input during normal spring runoff. These filters should normally be placed higher than the 50-year floodplain, to prevent them from washing out during high runoff events.

Temporary roads should meet the following erosion control standards and mitigations:

- a) **Temporary roads shall not be constructed in RHCA's**, as defined in BMP T-7. The exception to this is where the transportation system does not provide access to the area and a skid trail is necessary to cross the RHCA and to serve as access to the area. In this case a temporary road would be allowed, as an alternative to a skid trail. This should be evaluated and determined in the EA.
- b) The maximum grade should be 10% on temporary roads that will be used for more than one season. Broad based dips or rolling of the road grade should be used for cross drainage. See BMP R-7 for details of broad based dips.
- c) Temporary roads that are used for only one season, should have waterbars installed at the spacing recommended in BMP T-16 for skid trails. Generally temporary roads are removed prior to winter.
- d) Temporary roads should be removed by decommissioning (decommissioning implies recontouring the road to the slope that matches the contour or subsoiling and shattering a minimum of 80% of the compacted soil). Entrances of decommissioned roads should be closed with large water bars/or other barriers that would prevent access to the area. Subsoiled roads should have water bars and broad based dips along the length of the road to provide cross drainage. Cross drain spacing should be as recommended above.
- e) All drainage structures should be installed according to BMP T-16 or R-7 and shall be in place, prior to fall/winter wet season. Alternatively, they should be removed as discussed above, if no longer needed.

R-8. Title: Constraints Related to Pioneer Road Construction. The following practices will reduce impacts associated with pioneering roads.

- a) Construction of pioneer roads should be confined to the roadway construction limits unless approved by the ER/COR. Excavation shall be conducted to prevent undercutting the final cut slope and to minimize depositing materials outside the designated roadway limits.
- b) Erosion control work will be completed prior to periods of fall/winter precipitation.
- c) Live streams crossed by pioneer roads will be protected with temporary culverts or log structures unless timing of instream work is completed during the period that is allowed by

the Fremont National Forest, Guidelines for Timing of Instream Construction. Temporary structures shall be removed prior to the fall/winter precipitation period.

R-11. Title: Control of Sidecast Material. To minimize impacts from uncompacted material, all fill material within RHCA's should be compacted (versus side casting of material). These mitigations should be included in the contract road package.

R-12. Title: Control of Construction in RHCA's.

a) Roads, fills, sidecast, and end-hauled material should be kept outside RHCA's except where necessary for stream crossings. Compaction of fill material is required, per BMP R-11.

b) Trees that are located adjacent to the channel with roots that provide channel stabilization and shade shall be left wherever possible (generally removal of trees is only required if they pose a public safety threat. Also, minimize damage to roots and stems of trees that are to be left.

c) Stream channel crossings will generally be at right angles to the stream channel. The purpose of right angle crossings is to achieve an adverse grade in both directions from the stream crossing. This will prevent water from running down the road surface during high flow events.

d) Maintain the water table within the floodplain by not cutting through the soil and developing a ditch that will drain the area.

e) Floodplains will remain intact and water will be allowed to flow over the entire width of the floodplain without being constricted by the road, (ie. do not elevate the roadbed above the floodplain without additional outlets through the fill area; do not constrict the channel). Additional outlets may consist of culverts or low water fords that are placed throughout the entire length of the fill (if feasible) to maintain floodplain function.

R-13. Title: Diversion of Flows Around Construction Sites. The Oregon State Guidelines for Timing of In-water work to protect fish and wildlife will be followed. Waivers may be sought from time to time in emergency situations (such as catastrophic floods that wash roads out that require immediate replacement) or other factors affecting the timing of the project. In such cases, coordinate with Zone Fisheries Biologist and local State biologist to obtain a waiver. If threatened, endangered or proposed species occur in or downstream of the project area, contact the Level I Team member on the Forest for coordination with Fish and Wildlife Service. When diversion of flows around a construction site is not feasible, document rationale in appropriate NEPA documents.

The Forest Plan Standards and Guidelines, pg 200, identifies that project activities will be conducted in a manner to ensure that turbidity levels do not exceed ten percent of the pre-activity levels on perennial streams. Short-term violations for required in-stream construction work (i.e., restoration measures, bridges, etc.) are acceptable. Thus, projects that would result in long-term violations should use methods such as diverting water around the work area to reduce turbidity.

R-14. Title: Bridge and Culvert Installation and Protection of Fisheries.

- a) BMP, R-13 provides guidelines for timing of instream construction. The preconstruction engineer shall design culverts on fish bearing streams that will provide fish passage. This will require coordination with the fisheries biologist to determine the species, maximum velocities and other features that are necessary to obtain fish passage.
- b) Excavated materials shall be kept out of live streams unless it is designed to be placed there (ie. riprap, etc.).
- c) Sediment producing materials will not be left within the 100 year floodplain any longer than necessary to construct the facility. Once the construction is complete fill material will be removed and properly disposed of in upland areas. If a flood is anticipated during the construction period, the fill shall not be placed within the 100-year floodplain.
- c) Traffic will not be allowed to cross the stream during construction, except for short term duration projects that meet the instream guidelines in the Fremont National Forest, Guidelines for Timing of Instream Construction. Otherwise, bypass and access roads shall be suitably located including plans for their subsequent decommissioning.
- d) As defined in the Forest Plan through inclusion of the Inland Native Fish Strategy, culverts, bridges and other stream crossings shall be designed to accommodate the 100 year flood.

R-15. Title: Disposal of Right-of-Way and Roadside Debris. This practice is used to keep debris and slash generated during road construction and reconstruction out of watercourses. Slash shall not be disposed of within RHCA's unless specifically identified in the EA as mitigation to enhance large woody debris in the stream channel. Piling and burning, chipping, scattering, windrowing, and disposal into cutting units would be acceptable options depending upon site-specific conditions in roaded areas.

R-17: Title: Water Source Development Consistent With Water Quality Protection. The purpose of this practice is to provide water for road construction, maintenance, livestock, wildlife and fire protection while maintaining the integrity of the water source. Timing and amount of withdrawal shall be directed towards maintaining instream flows and fish habitat. When flows are too low to allow withdrawal, water should be obtained from another approved source. The Fremont National Forest Water Use Plan should be followed in water source development. The following are general guidelines from the Water Use Plan. More specific guidelines are found in the Plan.

Streams.

1. Pumping, damming or other activities, which dewater a stream will not be allowed, except as described under R-13 for dewatering of construction site.
2. Recommended discharge rates listed in Table 23 of the Forest Plan will be considered minimums.

3. Discharge rates in all perennial streams not listed in Table 23 will be maintained as follows:

- a. Flows will not be reduced more than 50% of the flow occurring at the time of withdrawal.
- b. In no case will flows be reduced to less than 1.0 CFS.

Be cautious that downstream appropriated water rights may necessitate maintenance of flows higher than these minimums.

Springs and Seeps. Pond sources developed from springs and seeps will have a minimum of 25% of the water present at the time of withdrawal reserved in place.

R-18. Title: Maintenance of Roads. Maintenance of roads associated with the timber sale should be commensurate with the Purchaser's use to prevent erosion damage to the road and adjacent lands. Minimum road maintenance requirements are:

Blading and shaping of the road surface and ditches to maintain the original cross sections. Banks will not be undercut. Minimize the amount of gravel or other road surfacing material bladed off the road surface.

Ditches, culverts, and other drainage features shall be kept clear of earth, slash, and other debris to maintain their efficient functioning.

Purchaser shall repair all damage to the road surface, drainage system, and associated structures resulting from the Purchaser's operations.

Road fills, which wash or settle, shall be restored.

Snow will be removed during Purchaser operations by plowing it from the roadway so the road surface, road drainage, and adjacent resources are protected. This is further addressed under BMP, R-21.

Preventative maintenance will be performed before fall/winter periods of precipitation. This should include waterbarring, insloping, outsloping, and closing roads.

R-20. Title: Traffic Control During Wet Periods. Roads that are used for all weather use will have a stable surface and sufficient drainage to allow use during moderate runoff events. Roads could be temporarily closed when soil conditions would result in road damage as defined in the Fremont N.F. Road Damage Policy FSM 7770.3 Supplement. The authority for this action is under the Forest Supervisor, to be recommended by the District Ranger and Forest Engineer.

R-21. Title: Snow Removal Controls to Avoid Resource Damage. This BMP should be used to prevent damage to watershed quality and minimize the impact on road surfaces and embankments as the result of snow removal operations and/or melt water drainage. Forest Snow Removal Policy should be used when snow removal is performed. This policy includes the following:

- a) Banks shall not be undercut nor shall gravel or other surfacing material be bladed off the road.
- b) Roadbed drainage ditches and culverts shall be functional during operations and upon completion of operations. Snow will not be plowed into ditches and culvert inlets, nor will the existing snow in those locations be packed down.
- c) Snow removal shall be controlled to identify the usable traveled way having roadbed support. Over-width plowing shall be reshaped as necessary to define the usable width. Snow will be removed from the total width of the travelway, including all turnouts. Snow will be plowed away from ditches and brought across the travelway. Snow shall be cast over the edge of fill slopes and off the shoulders whenever practical to do so, with the exception that snow shall not be deposited in stream channels.
- d) Drain holes shall be constructed, and maintained in the dike of snow or berm after each snow removal operations. Drain holes shall be placed to obtain surface drainage without discharging on erodible fills. The Purchaser shall be responsible for periodic inspections and maintenance to ensure that the drainholes, ditches, and culvert facilities remain open and functioning properly. Changes in this responsibility may occur if other use occurs and is agreed to in writing by both parties.
- e) Roads shall be effectively closed after operations to wheeled vehicles at times and in the manner specified, on the operation plan.
- f) Remove snow for either public access or project use as established in the parent contract or permit.

R-23. Title: Decommissioning of Temporary Roads and Landings\ Road Closures. This practice is expanded to include any road that is designated for decommissioning.

- a) Block the road to vehicles using earth mounds, or other types of barriers which have proven effective in deterring vehicular use.
- b) Decommissioned roads and skid trails should have compacted surfaces subsoiled if recommended in the NEPA analysis for site specific projects. The Fremont Soil Productivity Guide (Update 2002) recommends emphasizing natural processes to break up compaction. Subsoiling implies the shattering of the compacted roadbed to restore soil condition. Subsoiling should be performed across the entire width of the surface with a minimum of 80% of the soil in a shattered condition. The pattern of subsoiling should be a J-hook that results in a waterbar and allows water to drain off the road and back to an undisturbed soil

surface. Spacing of J-hooks should be those recommended in R-7 for drainage structures. On decommissioned roads that are not J-hooked, waterbars shall be constructed at the same spacing as recommended for J-hooks. Also utilize blocking, erosion seeding, and logging slash where feasible in order to control access and minimize erosion.

Note: For the Black Hills Project, the IDT, through the NEPA analysis, determined temporary roads, skid trails and landings would not be subsoiled. The pumice soils within the project area are porous and compaction is not likely to be detrimental to continued productivity of native vegetation, nor cause excessive erosion. Temporary roads, skid trails and landings may be scarified to promote natural revegetation.

c) Alternatively, decommissioning could also include pulling fill back and re-contouring the road/trail prism to the original (natural) slope.

f) Where appropriate (stream crossings, areas immediately adjacent to channels, etc.) use measures to stabilize and/or capture sediment before it enters stream channels. Measures such as silt fences, straw wattles, straw bales are appropriate to capture sediment.

g) Blocked roads

Provide the appropriate number and spacing of cross drains on blocked roads to assure proper drainage. The following table is a guide for cross drain spacing:

Gradient (%)	Cross drain spacing (feet)
0–5	200–160
6–10	160–120
11–15	120–100
16–20	100–60
21–30	60–40
31–45	40–25
46 +	25

Roads that will have continued use for administrative purposes should have broad based dips constructed. Dips should be installed on a spacing recommended in the Fremont National Forest -Guide to Erosion Control on Forest Roads and Trails. Spacing = 400 feet/% Slope +100 feet. Broad based dips should be designed with an adverse grade on the downhill side and, where possible, should be armored with aggregate to prevent traffic from cutting through the structure.

Closed roads not needed for administrative purposes should have the culverts pulled and the floodplain reestablished.

Reason: Providing the appropriate cross drain spacing on roads and skid trails will help to keep water and eroded soil in the uplands. This will improve water quality by reducing un-naturally high levels of sediment and by keeping water in the uplands where it can be used by vegetation and where it is available for stream flow later in the season. The pulling of culverts or routine inventory and maintenance on closed roads will eliminate or reduce the likelihood of culverts and associated road fill failing and releasing large quantities of sediment into the waterway.

R-24. Title: Landscape and Hazardous Material (Fremont National Forest Supplement).
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- 1) Mechanical Equipment shall not be operated in live streams without written approval by the Contracting Officer.
- 2) All petroleum products or other hazardous substances (as defined in 29 CFR 1910.120) shall not be released on or into land, rivers, streams, and impoundments, or natural or manmade channels leading thereto. Whenever equipment is required to work in or around water, protective devices as required by State and Federal Regulations will be on site. Servicing of all equipment shall be done in areas approved by the Contracting Officer or their designated representative. The Operator/Contractor shall dispose of waste oil, vehicle filters (drained or free flowing oil), and oily rags in accordance with applicable State and Federal regulations and such material shall be transported off government property in accordance with State and Federal regulations.
- 3) If the total oil or oil products storage exceeds 1,320 gallons or if any single container exceeds a capacity of 660 gallons, the Operator/Contractor shall prepare and submit a Spill Prevention Control and Countermeasures (SPCC) Plan. Such plan shall meet applicable EPA requirements (40 CFR 112) including certification by a registered professional engineer. This plan shall include notification of appropriate state and federal officials, the Contracting Officer, and other appropriate agencies.
- 4) The Operator/Contractor shall immediately take action to notify the appropriate agencies (including the Contracting Officer, or designated representative), contain, and clean up, without expense to the Government, all petroleum products or other hazardous substances releases which are in the vicinity of the project and which are caused by the Contractor's employees, directly or indirectly, as a result of the construction operations. In the event the Government determines that additional resources beyond those of the Contractor's are required, the Contractor may be held liable for all damages and costs of the additional labor, subsistence, equipment, supplies, and transportation deemed necessary by the Government for the containment and clean up of petroleum products or other hazardous substances releases caused by Contractor's employees or resulting from construction operations.

The Contractor shall notify the Contracting Officer, or designated representative, of any hazardous materials (as defined in 29 CFR 1910.120) to be used on the job and shall have Material Safety Data Sheets (MSDS) for those materials available on the job. All such materials shall be labeled in accordance with federal and state regulations.